2. Experiments in a ship environment.

Preparatory work.

“In 1896,” writes A. S. in one of his brochures, “the first news of the experiments of Marconi in England appeared. The essence of the experiments was kept in the strictest confidence and all the information that special magazines could receive throughout the winter and spring of 1897 about these experiments were limited by the fact that a new method was discovered for detecting and for exciting electromagnetic waves, and that their long and short signals could be sent with help over a considerable distance. " “Regarding newspaper notes about this, I,” writes A. S., “published an article in the Kotlin newspaper in October (1897), where I indicated my device as solving this problem and noting the approach of a thunderstorm in 20- 30 versts. "

To introduce maritime society to his invention, A. S. in March 1897 gave a lecture at the Kronstadt Maritime Assembly "On the possibility of telegraphy without wires" and for the first time demonstrated signal transmission within the building. This lecture, and especially the news about the new success of Marconi, who established communication at a distance of 12 kilometers, convinced everyone of the need to continue the experiments on a larger scale. It was decided this year to conduct experiments on the ships of the Mine detachment.

Preparatory work began with the development of Goertz vibrators. The low-power vibrator consisted of two balls with a diameter of 30 cm, connected to each other by a rod cut in the middle. The experiments made in the Kronstadt harbor, gave for such a vibrator a range of 300 fathoms with a spark of about 1 centimeter. Moreover, in these experiments, the sensitive tube contained iron powder.

Further success was obtained with a slightly modified tube. Small steel beads, poured instead of iron powder, significantly increased the sensitivity of the receiving system and also the distance of 300 soot. was easily obtained with a spark of 4-5 mm.

Now, to increase the range, there is only one way left - to increase the power of the vibrator.

The second vibrator of high power had disks instead of balls of a special shape, with a diameter of slightly less than one meter, which significantly increased the system's capacity. The spark gap in the new vibrator was arranged between two hats with a diameter of 10 cm, and the spark, as in the first vibrator, occurred in oil. The preparatory work was supposed to stop there. Unfortunately, responsibilities in Nizhny Novgorod distracted A. S. from further work and had to be carried out in his absence, without his personal guidance.

Experiments in the Mine detachment in the company of 1897,

For the first experiments, a high-power vibrator was installed in a special booth near the so-called Infirmary pier on the island of Teykar-Sari. The receiving station was installed on a steam boat specially designated for experiments. This station consisted of a receiving wire with a length of about 4 soot and a sensitive tube inserted into the circuit of two elements and a Carpentier voltmeter. By the deviation of this voltmeter, the action of the receiving station was detected.

Numerous tests under these conditions established the greatest range of about 3 versts. For further experiments, the receiving station was transferred to the cruiser "Africa", where the height of the receiving wire could be brought up to 9 fathoms, due to which the range of the station rose to 5 versts.

The experiments of this summer were completed by installing a telegraph communication between the training ship "Europe" and the cruiser "Africa".

The relay, prepared by own means from a sensitive voltmeter, made it possible to receive signals using a telegraph apparatus. The sending station was transferred to the training ship "Europe", where a vibrator of high power was installed on one of the bridges in Utah. A spark of about 10 mm from this vibrator made it possible to receive telegrams at a distance of 3 miles.

The first experiments in the ship's environment immediately discovered all its flaws. Metal gear, it turned out, absorb a significant portion of the energy emitted by the sending station, and often completely block the receiving wire from vibrations sent to it. The same experiments highlighted the question of the most advantageous form of a vibrator for a ship departure station. Such were the first attempts to achieve practical results in the newly discovered, little-known field of electromagnetic waves.

Experiments in the Mine detachment in the company of 1898.

By the beginning of the new summer trials, many details were revealed that were of great importance for the success of the experiments. By this time, it became clear that the sending station should send energy as much as possible from a larger surface, that is, it became clear the need to have a sending wire or a sending network. Many details were clarified for the design of receiving stations. These stations this year had to be assembled from separate parts. The relays and telegraphs were Siemens systems, and the sensitive tube still contained finely chopped steel beads. At the coast station for experiments on two masts, a network was raised in the form of a large quadrangle, which during transmission was connected to the high-power vibrator described above. On the training ship "Europe" and on the cruiser "Africa" the nets consisted of two enormous loops going through the rooks and connected together by wire through the claws of the masts. This form of network was considered necessary in order to avoid the blocking action of the metal parts of the vessel.

In the first experiments of this summer, a glass of oil was accidentally broken, which did not in the least affect the effect of the vibrator. This case showed little benefit of the oil and after that it is completely taken out of use. The largest spark that could be obtained with the above networks in the air was from 10 to 13 mm. To test the best shape of the vibrator, in addition to the above, vibrators were prepared from solid balls of different diameters and from solid cylinders of different lengths. The experiments found that all these vibrators connected to the network gave the same result. Thus, it became clear that the network itself is a functioning vibrator and that to obtain a discharge it is enough to use two small balls of a spark meter.

Towards the end of the voyage, the question was raised about the effect of the departure station on the compass needle. A special commission assembled to resolve this issue determined the minimum distance between the compass and the station at 7-8 meters.

So the experiments of the second voyage revealed the need for a ship's shipping network, but the question of the shape of the network remained open. The tested network turned out to be too complicated. It really made it possible to receive telegrams at all positions of the vessel, but such a complex network was difficult to isolate sufficiently from the metal parts of the vessel.

The greatest distances achieved during this voyage were: 3 miles between ships and 6 miles between the coast station and the cruiser Africa.